

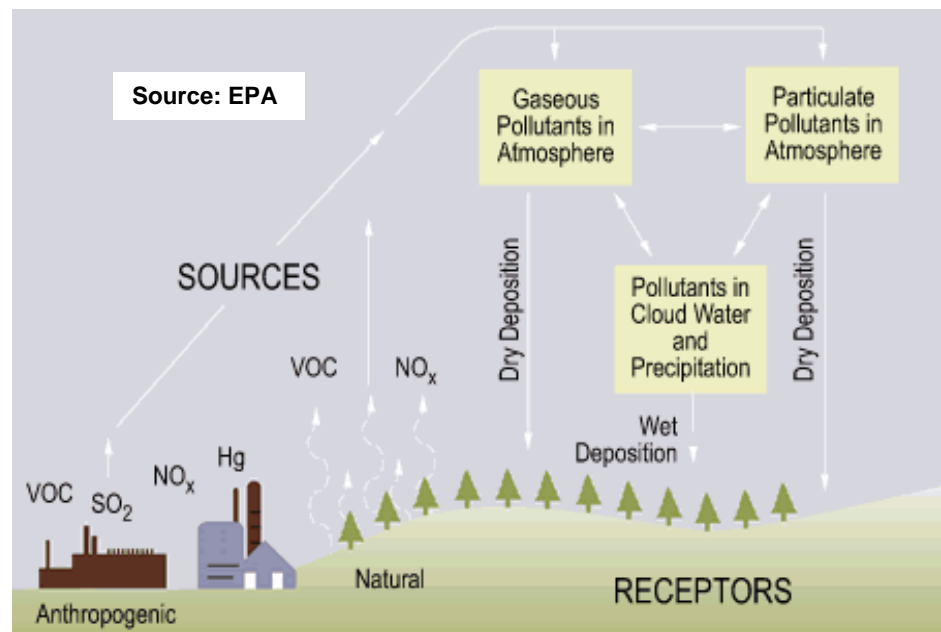
Acid Rain – What Does it Mean for Kansas?

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If the term “acid rain” evokes images of people dissolving in clouds of smoke in the rain as if in a horror film, rest assured that the consequences are not so severe. Acid rain need not be an excuse to avoid doing outside work! Nonetheless, acid rain can have long term negative impacts on the environment and architectural materials.

Acid rain, or more correctly, acidic deposition, is the shift in precipitation pH levels resulting from the mixing of precipitation with acid-forming compounds emitted into the air by human activities and natural sources. The principle acid forming compounds are sulfur dioxide (SO_2) and nitrogen oxides (NO_x), which may be emitted by a variety of sources which combust fossil fuels, including, among other sources, automobiles, power plants, and boilers, or by wildfires and other natural sources. Acid deposition occurs either as wet or dry deposition. In wet deposition, the SO_2 and NO_x particles react in the atmosphere with the moisture, oxygen, and other chemicals before falling to the Earth's surface. In dry deposition, the particles fall to Earth, where they may fall into water bodies, onto snow, or combine with subsequent precipitation to form an acidic runoff.

The effects of acid rain can include changes to aquatic and terrestrial ecosystems, and the degradation of architectural features and statues, and paints. This problem is especially associated with the Northeast United States, where the high concentration of population results in significant quantities of SO_2 and NO_x emissions from the vehicles, and power plants needed to sustain these populations. Coal-burning power plants in the Northeast typically burn a higher-sulfur coal than in other areas, resulting in higher emissions of SO_2 . But the phenomenon of acid rain has also surfaced in the high Rocky Mountains, including Rocky Mountain National Park, in what appear to be “pristine” lakes.



Aquatic species that are adapted to specific pH levels may be unable to successfully thrive in waters significantly altered by acid rain. Additionally, in some circumstances, the acidic deposition may shift soil pH to levels that plant species do not thrive in, thereby altering the species composition of forests and other ecosystems.

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The Federal Clean Air Act, as amended in 1990, includes measures intended to remedy the problem of acid rain. In implementing these measures, the U.S. Environmental Protection Agency (EPA) has adopted regulations that seek to reduce emissions of NO_x and SO₂, including caps on emissions of these pollutants, and a system for trading emissions reductions between sources so that the most efficient means of reducing emissions is encouraged to achieve the greatest overall reduction.

Kansas is not significantly affected by acid deposition. Water sampling has been limited, but indicates that acid rain impacts are essentially non-existent, or at least non-measurable. The soils in Kansas are typically higher-pH soils, which would buffer the limited amount of acidic deposition that may fall on the state. Kansas has implemented portions of the federal acid rain program, primarily the acid rain permits program. The acid rain permit regulation, K.A.R. 28-19-275, will be updated soon to adopt federal changes, and the bureau is considering adopting the nitrogen oxides emissions reduction program. The Bureau of Air and Radiation continues to coordinate with the Bureau of Water and the Bureau of Environmental Field Services to be aware of any future change in the environmental conditions from acid rain.